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ABSTRACT

Subjective engagement and cognitive skills are important for various aspects of writing skills. For the work of writing to be efficient, the student must be able to function in both a rhetorical and productive situation, defined in terms of subject, function, and audience. The processes of writing--defined as planning, translating, and reviewing and revising--require that the student readers in the classroom, the school, and the wider society. Three pages of references conclude the report. (GJ)

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Student Engagement and Skill Development in Writing at the Secondary Level

by
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Student Engagement and Skill Development in Writing
at the Secondary Level

Introduction

This paper explores the nature of student engagement in writing at the secondary level. The importance of writing increases as students progress through school, yet schools do not do as well in developing students' writing skills as they do in developing their reading and computing skills. In this paper, we focus on the kinds of activities involved in writing, the conditions under which they flourish or languish, and their implications for teaching.

We distinguish between two aspects of student response to writing tasks. One aspect is the student's subjective engagement with the task--the phenomenology of writing processes. The second aspect is the student's use of various cognitive operations to transform information into a written product. This paper will explore how subjective engagement and cognitive operations are influenced by the ways teachers structure writing tasks and motivate and enable students to work on those tasks.

We first consider subjective engagement in writing--the unfolding of interests, purposes, ideas, and insights that occurs when students think about a topic for writing and about their writing in progress. For an understanding of subjective engagement, we draw on research on the composing process (Humes 1983). From this discussion we will draw implications for teaching.

After discussing engagement, we will consider the component cognitive skills students use when they write and the ways that a suitably designed curriculum can develop these skills. For an understanding of cognitive skills, we supplement research on the composing process with research on the psychology of learning, especially information-processing theory. Writing

tasks require students to perform increasingly complex work because elementary cognitive processes become embedded in higher cognitive processes when students are asked to produce written work organized around a theme.

Some researchers (Loban 1976) view writing development as primarily the result of moral, social, or cognitive growth. Bereiter (1980) argues that even though writing development may be a reflection of other types of growth, the study of writing must focus on the aspects of the craft most responsive to direct influence for it to be educationally relevant. Evidence about conditions that generate subjective engagement in a writing task should inform research on teacher preparation of writing tasks. An examination of the cognitive abilities necessary for the writing process should yield suggestions for instruction and curriculum design.

Writing Tasks and Subjective Engagement

Composing Processes

The conceptualization of the task demands that writing makes on secondary school students begins with what has been learned about writing in general. Writing is widely described in terms of "composing" processes (Humes 1983). Composing involves three phases: planning, translating, and reviewing and revising. Using research on the composing processes, we discuss each of these phases in terms of the kinds of subjective engagement involved. After exploring each phase of composing, we discuss the "recursiveness"--or concurrent interaction--among what might seem to be linear and consecutive activities. Then, we consider how the ways that teachers structure writing tasks influence subjective engagement. Finally, we conclude this section by exploring how teachers can motivate students and enable them to become subjectively engaged.

Planning. During the planning phase, the writer constructs a mental representation of the rhetorical task--subject, function, and audience (Applebee 1984). Flower and Hayes (1981) conclude from their research that a writer's ability to define a rhetorical problem is an important part of "being creative" and can help to explain why some students are good writers while others are poor writers. This mental representation is not a literal text in most cases but a schematic representation of the main ideas and arguments. Stallard (1976) envisions conceptualization of the message of a piece of writing as the writer's first concern:

> As such, communication is not the initial concern of the writer. It is not possible for a writer to outline his message or for that matter impose any order or form prior to having conceptualized at least the major element of its content. . . . In those cases where the message is fairly complete in the mind of the writer, the task is one of transcribing rather than one of composing. Even then, the process of conceptualization has functioned prior to the transcribing. (p. 182)

Some researchers distinguish between global planning and local planning (Pianko 1979; Flower and Hayes 1981; Humes 1983). Global planning generally addresses the basic task dimensions and fills in at least enough material in the mental outline to allow the writer to begin writing. Global planning might define a beginning, middle, or ending point or all three. Clearly, the more concrete the global plan, the easier the task of beginning to write will be. According to Humes (1983), research has found that good writers spend more time in planning than either average or poor writers and that good writers spend more time in global planning while poor writers concentrate on local (sentence- and word-level) planning. This may result from the fact that the most easily automated writing skills (knowledge of grammar, syntax, spelling, and alternative word choices) often guide sentence- and word-level decisions and that good writers have managed to automate these skills more successfully than poor writers.

Planning depends on the student's subjective engagement in the rhetorical task. How does the student interpret the rhetorical task? The thrust and thoroughness of the interpretation determine the thematic focus for thinking about the task, the stock of knowledge available for developing the theme through personal associations, the breadth of experience and imagination brought to bear in relating the theme to the reader, and the coherence among the various sections of the representation.

Translating. The translating phase begins when the student puts pen to paper or fingers to keyboard. Flower and Hayes (1981) describe it as "putting ideas into visible language." During translating, then, the plan takes concrete form. The writer creates an imaginary "other" in his or her mind as a potential audience for the written product; the perspective of this audience is defined imaginatively as translating proceeds. How would the teacher or another student react to this or that word? What might lose the reader's attention? What degree of formality is appropriate? The communicative function takes greater priority during translation, whereas during planning, the organization of one's own ideas may be paramount.

The sutdent's subjective engagement is important during translating as well as planning. How whole-heartedly does the student project himself or herself into the crafting of language and into the encounter with an imaginary audience? Engagement sustains the vividness of the writer's mental representation of the message, it provides access through association to diverse elements of experience that have yet to be integrated into the treatment of the theme, and it enlivens the imagined dialogue with the reader. Furthermore, the level of engagement determines the writer's perseverance in pursuing lines of thought that emerge only after the planning phase.

Reviewing and Revising. The third and final phase of writing

involves reviewing and revising what has been written. Humes (1983) chooses to see reviewing and revising as two separate subprocesses of the composing process. The activities described are so intertwined, however, that it seems an artificial distinction to separate reviewing and revising. Therefore, for the purposes of this paper, they are included as two parts of the same process.

When students review their papers in order to compare the text with the original plan (Humes 1983), they have an opportunity to analyze the consistency and accuracy of the words they have written. If they take this opportunity seriously, they are in a position to revise the text and thus bring it closer and closer to their plan--what they meant to say. A problem among remedial writers, it should be noted, is that when they review, they read what they intended to write, not what they actually wrote. This suggests that while reviewing, students need to be able to shift the center of their subjective engagement with the task back and forth between the plan and a perspective on the text as others might read it.

Reviewing may entail proofreading for grammatical or spelling errors but in its broadest application should involve clarification of thinking, clarification of language meant to communicate, and an attention to style and audience. Reviewing can lead to further planning and translating or to revising the text.

The revising process has many of the same aspects as the initial translating phase, with two important differences: the student now has to deal with frustration and (hopefully constructive) criticism rather than the initial enthusiasm for a message; in addition, the student now may experience greater insight into the topic and a sense of growth in what can be said about the theme.

Stallard (1976) believes that writers should revise mentally before

they encode the message into communicable form. Wason (1980), alternatively, prefers to revise extensively on paper. He hypothesizes that writing includes three phases. The first is to get the ideas on paper without concern for style or complete development. In the second phase, the writer reorders text, changes sentences, and deletes or adds material. The third phase is a complete redraft, involving further clarification and usually leading to new thought. He describes this process of criticism or revision as creative. "It does not merely refashion language," he states, "it enlarges thought. Scrutiny of language alters the thought expressed in language" (p. 133).

Recursiveness of Composing Processes and Intrinsic Motivation

Although we have treated writing as a linear process thus far, several researchers (Emig 1971; Sommers 1979; Hayes and Flower 1980; Perl 1983) have emphasized that it is recursive. Humes (1983) provides a succinct definition:

> As a process writing does not move in a straight line from conception to completion: All planning is not done before words are put on paper; all words are not on paper before writers review and revise. Writers move back and forth among these subprocesses. For example, after text has been composed on paper, the writer may notice a gap for which new content must be planned. (p. 205)

While the writing process may be taught in a linear fashion (i.e., the student first plans, then translates, and then reviews and revises), it is important for students and teachers to understand that recursiveness describes the way most people write. Perl (1983) indicates that "the parts that recur seem to vary from writer to writer and from topic to topic." She also finds that certain recursive elements are obvious while others are difficult to identify. For example, rereading pieces of text is a visible sign of recursion; however, focusing attention repeatedly on the "felt sense"

(Gendlin 1978)--nonverbalized perceptions that encompass everything a writer feels or knows about a given subject--is an invisible activity that is almost impossible to track.

Students holding a linear image of the writing process may be limited by the perception that all planning and discovery of meaning takes place before the first word is put on paper. According to the recursive theory, thoughts are often repeatedly translated, reviewed, and revised as the text is being written because of discoveries that takes place during the act of writing.

This emphasis on discovery suggests that the generation of intrinsic motivation may be an important element in subjective engagement in writing (Csikszentmihalyi 1975; Corno and Mandinach 1983; Doyle 1983). Intrinsic motivation stems from the process of discovering meaning for oneself and from the expectation that the audience will respond (Bereiter 1980). Intrinsic motivation arises in the course of writing because the text evolves to fit global plans, thus giving the writer a sense of self-realization and hence positive self-evaluation.

Structuring Writing Tasks: Purpose and Context

Given this conceptualization of writing processes and the importance of students' subjective engagement in writing, what can we say about conditions of writing that influence engagement and that teaching practices, in turn, influence? We have suggested that the rhetorical task--determining subject, function, and audience--is extremely important. What approaches do teachers use to present this task to the student?

First let us consider the purposes for which students are asked to write. Writing is taught for various reasons--to prepare students to function in economic and civic activities; to prepare students for

scholarship in various academic disciplines; to facilitate cognitive development; to facilitate expression of sentiments and the development of imagination; and to stimulate reflection on, maturation in, or emancipation from one's life situation (Mosenthal 1983). The values that teachers bring to writing vary. According to Applebee (1981), teachers may focus on the improvement of students' writing skills or the expansion of students' concepts. Teachers may also focus on writing as a vehicle for articulating the student's personal experience or subject matter information. These different purposes influence how the teacher represents the writing task to the student.

In addition to influencing how the student views the subject, teachers define writing tasks in terms of what Applebee (1984) calls the function and audience of writing. Applebee identifies four functions or uses of writing: mechanical, informational, personal, and imaginative. We will confine our attention to the mechanical and informational because they are more widely used in classroom situations and because generating student engagement in such writing is more difficult than with personal or imaginative writing. Mechanical writing includes writing done to comply with school tasks that require only short written responses or that fulfill prespecified formal procedures. Examples are fill-in-the-blank workbook assignments and material copies from textbooks. Informational writing includes "expository writing, ranging from simple reports . . . to . . . theoretical arguments" (p. 14) and persuasive writing.

Applebee also identifies four types of audience: self, teacher as respondent ("in instructional dialogue"), teacher as examiner, and wider audiences. Of particular importance is the distinction between the teacher as respondent and the teacher as examiner. The first case involves genuine communication of information; in the second case, the student and teacher

simulate communication of information so that the student can display knowledge and the teacher can evaluate it. As the student moves from mechanical to informational writing, and from writing for the teacher as examiner to writing for the teacher as respondent, the student's subjective engagement in the task changes.

Engagement also changes when the student writes for wider audiences. By writing for specified audiences (the editor of the local newspaper, a college president, an author, a basketball coach, the president of General Motors), a student can discover his or her own "voice" in a number of styles. A student can also learn to integrate the readers' perspective with his or her own. Evaluating one's own writing in terms of how or what it will communicate to the intended audience contributes to the development of a personal style and viewpoint (Bereiter 1980). This development lends a sense of authenticity to the writing task and helps students to perceive writing as a productive craft used to fashion products that uniquely express their individual ideas.

To return to Bereiter's argument, it would seem that teachers can directly influence their students' awareness of the importance of understanding and clarifying the rhetorical situation (purpose, functions, audience). Several studies (Emig 1971; Applebee 1981; Scanlon 1983) suggest that students benefit from a comprehensive planning process, which can include in-class prewriting activities such as reading and discussing, examining models, or suggesting resources. Applebee (1981), however, found that teachers spent an average of only three minutes of classroom time on prewriting activities after they made a specific writing assignment. In addition to guiding planning activities, teachers need to become more proficient in setting the task dimensions for writing assignments--that is, defining the topic, audience, purpose, format, method of evaluation, and

relevance of students' prior knowledge and experience (Applebee 1981).

There are limits to the benefits of teacher specification of planning procedures, however. Students need to learn to guide their own planning because much of the planning for writing takes place in the writer's mind or involves library or field research.

If teachers at least occasionally try to put themselves in the place of their students by responding to an assignment themselves, they will become more aware of the unanticipated problems in planning the content of a writing assignment. If, as Flower and Hayes (1981) assert, writers create a hierarchical network of goals that guide the writing process, then students will need clear and reasonable task dimensions before they can establish effective goals. Of course goals can be changed or dropped and new ones added throughout the writing process, and certainly as the work progresses the writer's original goals "grow into an increasingly elaborate network of goals and sub-goals" (Flower and Hayes 1981). Yet the organizing purpose of the paper must be conceptualized if the work is to achieve coherence. Changing this purpose, or "keyword," as Flower and Hayes call it, requires the writer to create a new and different piece of writing.

Stallard worries that teachers who are primarily concerned with such elements as outlining, style, and paragraph development may unintentionally encourage students to overlook or cut short the process of conceptualizing the message and to give premature consideration to mechanics. If the mechanical elements of writing constrain the content before it is clearly thought out, the result will likely be an underdeveloped product.

Teachers also structure the translating process by specifying the function of writing. Where there is an informational purpose, the question of brevity versus completeness comes to the fore. What does the reader need to know to understand this sentence? Where the function is mechanical or

need only simulate being informational (because the writing is addressed to the teacher as examiner), the translating may shrink to the "busyness" of covering paper with appropriate words. The fact that many school writing tasks are of this sort can deny students practice in applying their attention to writing and in keeping a plan in view as translating proceeds.

The way that teachers structure writing tasks also influences the students' subjective engagement in the reviewing and revising phase. Pianko (1979, cited by Humes 1983) found that poor writers review for mechanical errors rather than for matters of style, purpose, and audience. Moreover, poor writers do not rethink their compositions as much as do competent writers. Much of writing, then, is arduous labor (Lopate 1978)--the student must grapple with meaning and be willing to work through the expression of an idea until it is clear and relevant to the discussion as a whole. Too often students simply stop before they have reached the point of completion. As Wason (1980) says, "It is in learning when not to stop that progress is made." Teachers can prevent students from stopping too soon by emphasizing the importance of reviewing and revising, by valuing the process of writing at least as much as the finished product, and by challenging students when their formulations are vague or meaningless. Teachers can also require drafts of students' first papers and give specific direction to revising through their comments and suggestions on those drafts.

Finally, when teachers help students to understand recursiveness, two things are accomplished. First, it helps students be more open to change after the planning stage is largely finished (i.e., they would not feel bound to write only what they had planned to write but would be receptive to new insight and perhaps to new organizing strategies as they are writing). Second, such an understanding motivates students to feel more committed to their writing. Knowing that they may discover new relationships or ideas in

the act of writing enlarges the writing process beyond the confines of mere transcription of what the student already knows. Scanlon (1983) notes that "the formalistic approach to writing that predominates today encourages students to box their ideas in ready-made forms, to write by formula." Such an approach to writing discourages rather than stimulates commitment to what is being said.

Motivating and Enabling Engagement: Personal Commitment and Community

Thus far, we have treated subjective engagement as a temporary phenomenon that occurs while students are responding to tasks. As such, it seems to be open to enhancement as intrinsic motivation develops. We would also suggest that a more permanent personal commitment to good writing is an important foundation for engagement. If students do not have such a commitment at the outset, teachers must create conditions to develop it.

First, the environment in which writing is assigned, produced, and evaluated must communicate the fact that writing is important (Mischel 1974). A decade ago Miller (1974) recognized that attitudes toward the uses of language in general must change:

> The most important task we face is not changing habit--habits of speaking or writing, habits of spelling or misspelling, habits of comma overuse or underuse; but rather changing attitudes--attitudes toward language, toward linguistic experience, attitudes toward the possibilities of language in exploring and discovering the world, attitudes toward the power of language in affecting and moving individuals and groups, attitudes toward the delicacy of language in discriminating and limning the subtlest of human feelings or the most complex of human situations. (p. 362)

Teachers need to guide students to the discovery that writing can help define them as human beings and can be a powerful tool for influencing others; they need to learn that writing is more than a set of rules waiting to be employed in the service of an artificial classroom assignment.

Teachers need to be concerned with students' personal commitment to the writing task (Bereiter 1980; Applebee 1981; Gage 1981).

Such commitment can be fostered in several ways. The students' commitment is encouraged when the teacher presents the assignment in a serious manner (Hayes and Flower 1980). Some types of assignments can alienate students. For example, Steinberg (1980) discovered in his own writing classes that task definitions that were too bizarre invited irritation or laughter from students rather than cooperation:

> I can remember a period here at Carnegie-Mellon University when, in our zeal for teaching problem solving in writing courses, we posited such bizarre audiences that we annoyed our students instead of motivating them. In one assignment, for example, we asked students to write an explanation of the use of the toothbrush for a native of the Canadian Arctic region who had never seen one. (p. 166)

However, by defining a more practical audience for the students' writing task, teachers can provide another powerful incentive for communicative writing. When the teacher functions as the sole audience, students often feel they are writing something that everyone already knows--in other words, that there is no natural purpose for the task of writing (Applebee 1981). One way of increasing the students' commitment to writing is to give them writing experiences with realistic purposes and real audiences who need to know something (Scardamalia, Bracewell, and Bereiter 1978).

In addition to motivating students to become subjectively engaged, teachers enable students to develop engagement by supplying them with appropriate resources, such as time and advice. Students' engagement waxes and wanes independently of preset times for in-class writing. The teacher needs to be flexible in lengthening or shortening the time allotted for uninterrupted writing as students indicate the need. Another problem is that students can spend their engagement time unproductively in detours. Also,

engagement can subside in moments of frustration or confusion. To prevent this from happening, teachers must be available and willing to provide assistance to students struggling with the translation phase of composition. Also, they need to provide feedback on some writing assignments during the early stages of composition in order to emphasize the idea that writing is a process. Moreover, if teachers want students to develop better writing skills they should provide some objective or holistic evaluation of all writing assignments, except those that they have specifically excluded from evaluation. Unfortunately, too few teachers currently possess the ability to evaluate student writing in such a way that students are guided towards developmental improvement without feeling discouraged (Applebee 1981).

Teachers can be overly forgiving audiences for student writers because they often have a tendency to interpret what their students write. They know what the students have to say and what should have been said; thus, they look for hints of what they expected from the student (Applebee 1981). A detached reader (a parent, peer, publisher, or professional) tends to be more critical and to demand more clarity of expression.

Student peers can be a responsive and critical audience (Bruffee 1973; Shaughnessy 1977; Applebee 1981). By discussing their writing orally, students can help each other articulate the "felt sense," and they can learn and teach as editors of each other's work. The important element in setting up a classroom in which students are critics of each other's writing is their shared understanding that the focus should be on the improvement of writing and not on judgments about the final product.

Too much emphasis can be put on having students interact with others while they are writing, however. Subjective engagement also benefits from privacy. Although teachers may coach during writing to help make students aware of their own composing processes, writing remains largely a private

endeavor. It is a process that demands long periods of concentration and thought in order to weave together the threads of interrelated ideas. In many instances, the classroom does not offer an ideal environment for uninterrupted thinking and careful transcribing. Classrooms are full of distractions. The student is likely to lose everything during a mental pause, which is a normal part of the translating process. In fact, one pattern identified among good writers is that they pause for a long time to plan between episodes of rapid translation (Humes 1983). Thus, an important part of creating an environment supportive of informational, as opposed to mechanical, writing is to ensure that students can pause without being distracted. Even if teachers plan to have students write outside of class--in the library or at home, for example--they still need to give some thought to how students can establish privacy in such settings.

In this section, we have used the concepts of planning, translating, and reviewing and revising to organize a discussion of students' subjective engagement in writing and the teacher's role in structuring writing tasks and in motivating and enabling students to engage in writing processes. We have suggested a number of practices that can improve engagement. In particular, the creation of a class community that values and responds to good writing provides a vital context in which students not already committed to the development of good writing may begin to acquire that commitment.

Writing Tasks and Cognitive Skill Development

By treating writing as a set of subjective processes through which each student composes an individual response to a rhetorical task, teachers may anticipate and respond to the uniqueness of each student's subjective engagement in writing. Enough has been said, however, to indicate the importance to all students of certain cognitive skills for writing. We need

to give special attention to the development of such skills among the large numbers of diverse students who typically must be served in a secondary school program. We rely on the findings of recent research on cognitive information processing to identify component skills that enable subjective engagement in writing.

One of the authors of this paper (Duckworth 1981) has written about how teachers influence such student academic work processes as learning how to decode written texts and how to perform simple arithmetical operations. The concept of academic work is here enlarged to include learning tasks in which simple operations are sequenced and nested within more complex operations. We now attempt to specify the kinds of cognitive skill development that provide students with a foundation and infrastructure for the kinds of subjective engagement described above.

As with direct instruction in basic skills, it may be profitable to build instructional improvement on the best research available. Much research on the learning of reading and arithmetic skills has employed behavioral models. Technical improvements in teaching based on these models follow from the specification of behavioral objectives and the design and engineering of appropriate cues, prompts, and reinforcements (Becker and Carnine 1980). This sort of rationale for design is implicit also in research that is less overtly behavioral, such as the Beginning Teacher Evaluation Study (Fisher et al. 1980), which reported findings that support the use of direct instruction. Underlying such improvements is the assumption that cognitive processes intervening between stimulus recognition and response are relatively simple. This assumption becomes less tenable as the desired behaviors become more complex, which is the case in the development of many skills important in writing. To be sure, mechanical skills, such as spelling, syntax, and punctuation, can be developed through

behavioral designs, especially in the elementary grades. However, as writing becomes less a reproduction of correct sentences and more an expression of and tool for increasingly sophisticated cognitive development in the secondary grades, designs must be based on cognitive psychology rather than behavioral psychology (Calfee 1981; Doyle 1983; Bereiter 1980; Chilver and Gould 1982; Hays 1983). In particular, we argue that external control must gradually yield to internal control of writing processes as students progress through a writing curriculum.

One reason for the importance of internal control is that writing involves such increasing complexity in the cognitive organization of material that the programming of learning sequences becomes unmanageable for the teacher (Floden 1981). Another reason is that criteria for task completion become more inferential. Writing combines easily perceived and evaluated mechanical skills and complex, sometimes subconscious, cognitive operations. Also, as the cognitive processes intervening between stimulus and response become longer in sequence, timely reinforcement of component behaviors and anticipation of the need for prompts and other resources become difficult.

Cognitive Operations and the Processes of Writing

The classification of cognitive operations that we identify as being employed in writing tasks is derived from Doyle (1983). He distinguishes "memory tasks" from "comprehension or understanding tasks":

> Memory tasks direct attention to the surface of a text and to the reproduction of words; comprehension tasks direct attention to the conceptual structure of the text and to the meaning that the words and sentences convey. (p. 163)

Different cognitive skills are used to process information. In memory tasks, text material is isolated from other cognitive material except for associative linkages (i.e., mnemonic devices). In comprehension tasks,

"ideas are abstracted . . . and organized into a . . . schema" (p. 163). Comprehension tasks require that each student make his or her own sense of material and then attempt to relate this sense to the "common sense" of the teacher and others.

In applying this distinction to writing tasks, we use Bloom's taxonomy of educational objectives (Bloom 1956) to differentiate the cognitive operations involved in comprehension tasks into paraphrasing, analysis, and evaluation. In paraphrasing, a writer transforms language, a process ranging from simple substitution of noun for noun and verb for verb (with appropriate grammatical changes) to complete restatement. Higher on the ladder of cognitive operations than paraphrasing is analysis, in which the writer breaks down facts and procedures with the aid of abstract categories of logic and semantics and then reassembles (synthesizes) them. Highest on the ladder of cognitive operations is evaluation. Evaluation comes into play in writing when the student considers the product's adequacy as a text and as a communication. Writing may be evaluated in terms of the criterion of exhibition of knowledge--the mental comparison of strings of facts stated with strings of facts implied by the assignment--and in terms of the reader's response.

Sternberg and Wagner (1982) and others make a further distinction between cognitive operations and metacognitive, or task decision-making, operations. We augment our categories of cognitive operations with the concept of task decision-making. Task decision-making is important because writing involves longer periods of work, often spanning several class sessions, than do simpler kinds of learning. To make progress on a task, students are required to supplement their classwork with library work and homework. Such work is performed without the supervision of the teacher. Elementary writing lessons are often of the sort that students can complete

in a single class session, so that control and direction of student behavior for a 45-minute span or so is a reasonable target. This situation changes when the assignment requires students to perform work over several class periods and study sessions, to organize larger masses of material under general categories, and to persist in learning how to transform material into some desired product. The student must be able to control and direct his or her own work.

What cognitive and metacognitive skills do the various phases of writing require? We now consider the skills required by each phase and then draw implications for schooling.

Cognitive Operations for Planning. Students have the greatest difficulty with planning--getting started with writing assignments. A good deal of planning, of course, has little to do with writing per se but concentrates rather on the organization of material relevant to the assignment. Beyond learning to set goals and establish a clear purpose in writing, students also need to sift available information. This sifting is part of a discriminatory capacity to judge what ingredients are needed to make a point, how the points should be organized, what constitutes sufficient supporting material, and when to stop. Students' awareness of these functions in their own writing contributes to clearer thinking and an improved product (Ney 1974; Stallard 1976; Flower and Hayes 1981). Hence, analyzing and organizing what is known are important cognitive operations during planning. Such strategies depend on the informational function, if any, of the task. Criteria for adequate writing may be expressed by the set of knowledge objectives for material that the writer is to summarize on paper and by the reader's expectations for relevance and logical coherence in the message. In essay writing, the organization of content or relevance and logical coherence depends on the student's completion of the definition of

the product--the student's decision on a thesis.

Thus, without the abilities to construct an intended shape for the product and to analyze and organize the knowledge available for producing an informative and persuasive piece of writing, students can be expected to experience mostly frustration and anxiety. They will likely use the allotted planning time to make abortive stabs at writing associative, conventionally strung-together sentences that reproduce or paraphrase sentences in the assignment instructions or in the texts the students are using. Somehow these sentences add up to the students' conceptions of a complete product. Whether such sentences do more than circle or crisscross the topic may depend on luck. If they are to avoid haphazard results, students need a framework for the kinds of decisions to be made in prewriting.

Because what the student knows is often insufficient to complete a plan, formulating strategies for acquiring new information is also an important cognitive operation during planning. Thus, task decision-making is important in the planning phase. Researchers distinguish between decisions about content and decisions about process (Pianko 1979; Flower and Hayes 1981; Humes 1983). An example of a content decision occurs when the student decides to include background information on the French involvement in the American Revolution in a paper on the French Revolution. In the same paper, a process decision occurs when he or she decides to organize the discussion into three main parts. A decision that combines both content and process is one in which the student decides to search for a suitable quotation from one of the leaders of the French Revolution to begin the paper. These two types of decisions and their hybrid, which probably occurs most commonly, are generated and modified throughout the writing process (Flower and Hayes 1981; Humes 1983).

In developing their analytical skills, students must learn to pose

counterarguments to their assertions while they are planning and writing (Shaughnessy 1977; Applebee 1981), and they must anticipate the needs and biases of their readers (Flower and Hayes 1981). Students need to learn the truth and applicability of Kenneth Burke's statement, "A way of seeing is also a way of not seeing," in order to see a subject from different perspectives and to be critical of their own writing, that is, to be able to read their work as a reader might.

Cognitive Operations for Translating. The translating phase of writing requires that writers articulate what is present in thought. It depends on a mastery of several skills that can be more or less automated: handwriting, spelling, punctuation, grammar, syntax, and transitional connections, to name a few (Humes 1983).

Making certain translation skills automatic seems to be one key to faster and more effective writing (Humes 1983). For children and inexperienced writers, satisfying all the mechanical and intellectual demands of writing "may overwhelm the limited capacity of short-term memory" (Flower and Hayes 1981). In fact, Flower and Hayes argue, "If the writer must devote conscious attention to demands such as spelling and grammar, the task of translating can interfere with the more global process of planning what one wants to say." Hence, students need to receive training in memory and lower-level cognitive operations such as paraphrasing before they are assigned more extended informational writing tasks.

However, there are mental skills involved in translating that go beyond memory and routine:

> Even when the planning process represents one's thought in words, that representation is unlikely to be in the elaborate syntax of written English. So the writer's task is to translate a meaning, which may be embodied in key words (what Vygotsky calls words "saturated with sense") and organized in

> a complex network of relationships, into a linear piece of written English. (Flower and Hayes 1981, p. 373)

There is the problem of remembering the plan for the paper and monitoring the text options and flow within that plan. Although Wason (1980) advocates creative translating, in which a relatively sketchy plan is elaborated in the course of translation, other researchers emphasize the importance of initial structure to guide translating.

Good writing displays careful word choice, a sense of rhythm, and an awareness of euphony on the writer's part (Humes 1983). In order to achieve good results in these areas, the writer tries out several options and selects the best-sounding one. Local planning, involving comparison and evaluation, continues during translating.

During translating the writer needs to sustain the main line of thought while developing subpoints and clarifying how all the parts relate to each other (Chilver and Gould 1982). Moreover, while constructing this "web of meaning" (Vygotsky 1962), the writer, particularly when using the discursive mode, must anticipate counterarguments and qualify assertions as they are made. A writer's reluctance to qualify bald statements can lead to assertions that are open to contradiction and that lack persuasiveness (Chilver and Gould 1982).

Cognitive Operations for Revising. Revising a written text requires the writer to review (and presumably analyze) a chain of thought or an argument, evaluate its adequacy on a number of criteria, and generate alternatives to segments of the text. Revision often involves reorganization, which may place a considerable strain on cognitive capacities. Hence, revision is a demanding task. The cognitive operation of evaluation requires special attention. The writer must try to take the perspective of another in anticipating criticism and in responding to

criticism received. Evaluation also requires the writer to juxtapose plan and execution and to judge the writing in terms of one's own intent.

Given these demands of revision, it is not surprising that it is so seldom required or performed in secondary school writing. An instructional design for developing writing capabilities must anticipate the cognitive demands of revision and build the skills and discipline necessary to carry it out.

Structuring the Development of Cognitive Abilities

The instructional requirements that give students the skills necessary to carry out writing tasks emphasizing memory are similar to those of decoding and arithmetical operations: clear, emphatic, and repeated presentations of the stimuli to be reproduced, followed by drill in repetition until retrieval is automatic and immediate. The main difference between this type of task at the high school level and the elementary-level tasks of decoding or arithmetic may be the need to train students in study skills so that the time they spend reading texts out of class pays off by giving them the ability to recall information for writing assignments.

To the extent that school writing tasks require students to reproduce conventional texts or to demonstrate that they have memorized facts and procedures, writing is simply one type of response to prompts for knowledge. The cognitive complications that occur in this type of response mainly involve the student's ability to handle larger volumes of memorized material.

Moffett (1968) cautions, however, against perpetuating an emphasis on mechanical skills into the secondary curriculum:

> Both reading and writing are at once shallow mechanical activities and deep operations of mind and spirit. . . . A common curricular assumption is that spelling and punctuation should continue to be taught beyond primary school, whereas this mere transcriptive skill is not developmental beyond the

> age of around nine. . . . All teaching of decoding and transcripting skills beyond this age must be considered remedial. In other words, we continue teaching these things only because we did not succeed in teaching them before, not because students were not developed enough to learn them. (pp. 15-16)

Moffett's view of the development that should take place in the teaching of writing at the secondary level is complemented by the findings of Applebee (1981) and Hays (1983). Both have suggested that students generally are not assigned enough expository or discursive writing at the secondary level to develop successful strategies for completing such assignments. There is a persuasive literature documenting the need for more student exposure to extended assignments that require the use of argumentation, synthesis, and analysis (Bruner 1973; Hayes and Flower 1980; Gage 1981; Chilver and Gould 1982; Hays 1983).

In secondary school, teachers need to assign more informational writing and require students to put facts together in new ways or use familiar procedures with new material. Students have to be able to substitute elements in language structures and transform those structures. Thus, the development of paraphrasing skills is required.

Applebee's research (1984) has shown that much writing in schools requires only a summary of disparate facts or procedures. In other words, students are required to use rudimentary conventions of narrative for stringing together pieces of information into a readable text. Students learn these conventions over the years through language arts instruction; lapses may be remedied by appropriate drill. Few other cognitive operations are required. Furthermore, teachers often supply formats for organizing the presentation of material--the outline specifies where the general assertion is to go and where the illustrative material is to be inserted; the product may be an essay or a lab report. Corno and Mandinach (1983) have argued that

such devices, which seem to be instructional responses to the cognitive requirements of planning for writing, often "short-circuit" a task by accomplishing the thinking for the student.

School instruction in the secondary years must develop analytic thinking. Applebee's research (1981, 1984) shows that writing assignments often require only what he calls "summary" thinking rather than analytic thinking. Analysis takes place locally--in statements of contrast about specific facts, for example--but the logical relationships of such local analyses to the overall organization of material or the rhetorical task is often missing.

The need for students to connect different parts of a paper during the translation process and to qualify their arguments suggests that teachers should teach not only the vocabulary required for these activities but also their logical bases. If students are trained to ask themselves how one sentence or paragraph is connected to another, whether by a "however," an "and," or a "conversely," they will become more fluid as well as more precise in their writing. The same is true in anticipating objections to points the writer makes. A student's ability to see other perspectives, without necessarily agreeing with them, is an essential part of developing what Bruner calls "analytic competency" (Hays 1983). At this stage of development "students confront coexisting and contradictory realities and see the need to reconcile them" (Hays 1983). Teachers can help students come to such a realization by suggesting alternatives to the main arguments in students' written work, by having constructive peer-group discussion of student papers, or by formally analyzing successful writing in class (Applebee 1981).

Finally, secondary school instruction must develop students' abilities to evaluate the quality of extended texts. This requires that students gain exposure to and appreciation of the strengths of exemplary

writing, and that they learn to apply the criteria for such appreciation to their own (and their peers') efforts. Furthermore, effective evaluation requires practice in the formulation of constructive criticism in contrast to ridicule and putdown. Needless to say, the teacher as model is crucial for the development of the student's ability to engage in constructive criticism.

Higher-level operations, however, are not often expected in school writing. Perhaps this is because teachers are uncertain about how to structure tasks to elicit these operations. This situation also may exist because of a general devolution of high school learning objectives towards recall and mechanical writing brought about by pressure on the teacher to grade students' work and to manage the multiple demands for curricular coverage.

We argue that the design of writing tasks at the secondary level needs to be progressive in terms of demanding ever higher levels of cognitive operations from students. Aside from the contribution of such a progressive design to students' writing competence, this argument is supported by the curricular purposes of writing: writing is assigned as a vehicle for understanding of subject-matter. Applebee (1984) also argues that high school students are increasingly capable of developing such higher-level skills in writing, as evidenced in their out-of-class work. If school assignments are to engage students, they must require students to use their available skills and they must challenge the students' skill development. An effective writing curriculum should enable students to increase their writing competence throughout the secondary school years.

Applebee gives considerable attention to the design of tasks involving essays. He emphasizes the importance of models and of practice in completing the form of a standard essay, but he also recommends that teachers engage in dialogue with students in order to build what he calls the

instructional "scaffolding" of students' knowledge as they construct a thesis and attach units of knowledge to the argument supporting that thesis. As the writing takes shape, the teacher removes this scaffolding and lets students work by themselves.

Hays (1983) argues that if teachers expect to teach discursive writing from a developmental perspective, they need to present students with a level of discursive and syntactic structure that is just above the one the students have already achieved. By employing this tactic, teachers constantly challenged students to mature as writers and thinkers. Bruner's theory, as analyzed by Smith (1977), suggests that when teachers limit writing assignments to types that students already know how to do (reports, descriptions, narratives), there is not enough intellectual challenge in the work to promote cognitive growth.

Motivating Cognitive Skill Development

In addition to structuring writing tasks to promote cognitive skill development, teachers must motivate students for them to develop the set of cognitive skills needed for effective writing. In their studies of basic skills learning, researchers put great emphasis on reinforcement of correct responses. Thus it was argued that by assigning tasks easy enough to provide students with high success rates, confirmed by test results, teachers could increase student motivation. This perspective is applicable to basic writing tasks, such as "mechanical" writing of short assignments. It is also possible to structure informational writing around specific criteria for the display of knowledge to the teacher-as-examiner, thus enabling the teacher to provide ready reinforcement of such display. Reinforcement is an inadequate concept, however, for thinking about motivating students to develop more complex skills.

Providing elaborate point systems as reinforcement during the various stages in the writing task is not the solution because such systems risk compounding the sense of failure that some students experience. The end result may be an emphasis on busyness and avoidance of failure rather than on improvement. Even highly motivated students can become overabsorbed in point systems and in turn become distracted from the real reason for writing. Ultimately, this makes the task less enjoyable. In other words, external task incentives may diminish the intrinsic motivation for writing and actually become counterproductive, according to Stipek (1982), who provides evidence that school incentives--extrinsic rewards for writing--may reduce the strength of intrinsic motivation. Thus, she argues that the control of high school student work should be shifted to the student. Morgan (1984), however, reviews research that indicates that external rewards diminish intrinsic motivation only when such motivation is weak to begin with. Morgan concludes that external rewards have no such detrimental effects when used as symbols of success for effective writing. Because we know too little about the effects of using incentives and because there is a need to sustain a substantive focus on the value of writing, we urge caution in the use of such reward systems to motivate students to write.

The difficulty in creating and sustaining incentives for writing is illustrated in Applebee's study (1984). Even in classes where the teacher had adopted sound procedures for defining tasks in terms of planning, translating, and revising, there were still students who wrote mechanically. The explanation Applebee suggests is that the larger incentive of getting a good grade in the course caused students to give highest priority to the task performances that obtained a good grade, i.e., displaying a knowledge of the subject matter and demonstrating an ability to approximate the form of a polished written text. Hence personal commitment to writing in itself

yielded to the stronger incentive of compliance with course requirements. This suggests that a complete instructional design for writing must consider the impact of general organizational incentives as well as more specific task incentives.

Enabling Cognitive Skill Development

The enabling of cognitive skill development also requires careful planning. The school must provide students access to materials, times, and spaces for writing. Resources for planning activities would include training students to outline and to generate themes from their personal stock of knowledge. Furthermore, the sort of "scaffolding" Applebee (1984) describes seems to be an essential resource in supplementing the student's own skills in planning activities.

Defining the conditions and sequences of activity in the translating phase is often slighted. Applebee (1981) supports the use of in-class writing activities as one way to offer support during the translating process. Such writing periods offer a fruitful time for teachers to explore with individual students the missing connections in their writing or the need for further development of ideas presented from a narrow perspective. With the teacher's guidance, students should not be so overwhelmed when the challenge of work stretches their capacities. Moreover, the availability of cues about the task agenda the teacher sets or the student decides upon is also an important resource.

The resources for revising are often insufficient. The comments teachers make on written papers are often not clear or helpful about the underlying problem or the direction for improvement; therefore, students are at a disadvantage even when they are allowed to revise after papers are returned. Time allocations for revision are frequently insufficient.

Teachers must supplement the time allotted for revision with additional time for meeting personally with the student in order to grasp the student's perspective and thus be able to offer pointers within that perspective.

The ultimate enabler, however, is the student's own "resourcefulness," which suggests that task decision-making skills may contribute to the development of the other skills discussed. The student must find times and places to think about assignments outside class time. The student must learn how to use library resources to develop and critically analyze a thesis.

Limits to Designing Writing Instruction around Cognitive Skill Development

In general, an attempt to specify a writing curriculum supplementing behavioral analysis with an information-processing model must acknowledge limits (Floden 1981). The capacity of human teachers to store programs for writing instruction is far inferior to that of the computer. Although Applebee (1984) and Hays (1983) seem not to acknowledge this problem, the time the teacher would need to monitor all students' cognitive operations of planning, translating, and revising exceeds the time available in secondary school instruction.

Given this situation, one inevitably has to turn to the student's self-management capacities in describing the implementation of such a writing curriculum, but the development of such capacities is a different task than the development of writing skills. Furthermore, the self-management of work by students involves more than the execution of planning, translating, and revising in sequence. As most authorities on student writing aver, the relationship of these three components is not always linear but, as we have noted above, is often recursive.

Ultimately, task decision-making skills depend on the same subjective

engagement they facilitate. The "executive" component in decision-making models is, after all, mainly a role the actor--here, the student as writer--takes on in order to carry out a task in which the actor is engaged. Thus such skills--and all the other skills described above--function and develop best where the teacher has enhanced subjective engagement through the practices described earlier.

Conclusion

In this paper we have emphasized the importance of subjective engagement and cognitive skills for various aspects of writing tasks. The overall writing task places the student in both a rhetorical and productive situation, defined in terms of subject, function, and audience. Until the student fully grasps this situation, the work of writing cannot be efficient. The processes of writing, defined as planning, translating, and reviewing and revising, require that the student construct a mental image of the product and supply particulars to flesh out this image, convert the result into a communication that addresses the task's rhetorical aspects, and evaluate that communication with respect to fidelity to the image as well as to the rhetorical task.

We have attempted to summarize research that identifies aspects of student engagement and cognitive operations associated with superior or inferior writing. We have also attempted to identify teaching practices that create the right conditions for subjective engagement and cognitive skill development among students. We found that while cognitive psychology--especially information-processing theory--can help the teacher think about the skills important for writing and their nurturance, at some point the elaboration of task components from an external, logical perspective overloads a purely rational-technical model for instructional

engineering of skill development. Furthermore, considerations of the motivation writing requires indicate that development of the student's personal commitment to the work is important for engagement.

Hence, we believe that future efforts to improve student writing should attend to the subjective side of the work processes and should frame issues of self-management or task decision-making in the context of subjective representations of the task's purpose and context. Furthermore, this requires that researchers pay more attention to the instructional implications of the audience for writing and the community of writers and readers in the classroom, in the school, and in the wider society. Given the increasingly widespread use of word-processing and computer-assisted instruction in writing, it is tempting to focus on applications of information-processing psychology to task design and monitoring. This sort of technological development, however, will be helpful only to those who become subjectively engaged in formulating and elaborating a theme and personally committed to informing or persuading an audience. Otherwise, students may incorporate the new technology into mechanical or perfunctory responses to writing tasks.

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